CLAIMS

1. Apparatus comprising

two or more electronic components, each of the components having

an internal circuit having a controlled element and a control element, and

terminals coupled to the internal circuit and adapted for surface mounting on a circuit board,

the internal circuits of the components being adapted to be connected in parallel through one of the terminals of each of the internal circuits to a common point of an external circuit and to cooperatively protect the external circuit against occurrence of an adverse electrical event,

wherein none of the electronic components has ratings sufficient by itself to protect the external circuit.

2. The apparatus of claim 1 in which the event comprises a loss of a source of power for the external circuit.

3. The apparatus of claim 1 in which the event comprises a sudden change in a voltage at a point of load of the external circuit.

4. The apparatus of claim 1 in which the controlled element comprises a FET.

5. The apparatus of claim 1 in which the internal circuit is adapted to detect a current reversal in a path between a power source and the external circuit, and the controlled element is controlled to disconnect the power source from the external circuit in response to the detection.

6. The apparatus of claim 1 in which the internal circuits are connected in parallel between a single power source and the external circuit.

7. The apparatus of claim 1 in which each of the internal circuits includes a voltage generator adapted to derive power from an external source and to provide a voltage to drive the internal circuit.

8. The apparatus of claim 1 in which each of the internal circuits includes a comparator that compares the voltages at the common point and at another point to determine when a current has reversed.

9. The apparatus of claim 1 in which the internal circuit comprises a FET and a control circuit connected to control the FET.

10. The apparatus of claim 9 in which the FET and the control circuit are formed on a single integrated substrate.

11. The apparatus of claim 9 in which the FET and the control circuit comprise discrete components mounted on a single substrate.

12. The apparatus of claim 10 or 11 in which the FET, the control circuit, and the terminals are part of a micro-lead package.

13. The apparatus of claim 1 in which the internal circuit includes elements adapted to pull up a voltage at one of the terminals when the voltage at the terminal drops and elements adapted to pull down the voltage at the one of the terminals when the voltage at the terminal rises.

14. The apparatus of claim 13 in which the elements comprise a DC-to-DC converter.

15. Apparatus for providing a filtering function to an external circuit comprising

a controlled element,

a control element for controlling the voltage across the controlled element such that the average voltage across the controlled element changes with variations in the signal that is to be filtered.

16. The apparatus of claim 15 in which the external circuit comprises a power converter, and the filtering function comprises ripple filtering of a power converter.

17. The apparatus of claim 16 in which the filtering function comprises attenuating the ripple generated at an output of the converter.

18. The apparatus of claim 16 in which the filtering function comprises attenuating the ripple generated at an input of the converter.

19. The apparatus of claim 15 in which the controlled element comprises a FET the conductivity of which is controlled to provide the filtering function.

20. The apparatus of claim 15 in which the control element includes elements adapted to detect a component of ripple at one of the terminals.

21. The apparatus of claim 20 in which the controlled element comprises a MOSFET, and the average voltage across the MOSFET is controlled to be greater than the peak-to-peak variation in the ripple.

22. The apparatus of claim 20 in which the control regime includes regulating the voltage variations across the FET to effect ripple attenuation.

23. The apparatus of claim 15 further comprising

terminals coupled to the apparatus and adapted for surface mounting on a circuit board.

24. The apparatus of claim 15 in which the controlled element and the control element are formed as a circuit integrated on a single substrate.

25. Apparatus comprising

a protection circuit, and

terminals for connecting the protection circuit respectively to a power source and to an external circuit that is to be powered by the source and protected by the protection circuit against an occurrence of an electrical event,

the protection circuit being connected to provide two different kinds of protection for the external circuit using two controlled elements.

26. The apparatus of claim 25 in which the protection circuit comprises two protection mechanisms connected in series between the source and the external circuit.

27. The apparatus of claim 25 in which the protection mechanisms include two FETs connected in series.

28. The apparatus of claim 27 in which the FETs are connected in a common drain configuration.

29. The apparatus of claim 27 in which the FETs are connected in a common source configuration.

30. The apparatus of claim 25 in which the protection circuit comprises two protection mechanisms connected across an external circuit.

31. The apparatus of claim 30 in which the protection mechanisms include a FET.

32. The apparatus of claim 30 in which one of the protection mechanisms shunts current away from the external circuit.

33. The apparatus of claim 30 in which one of the protection mechanisms delivers current to the external circuit.

34. The apparatus of claim 32 in which the protection mechanism shunts current to ground.

35. The apparatus of claim 32 also including an energy reservoir at a predetermined voltage, and in which the protection mechanism shunts current to the energy reservoir.

36. The apparatus of claim 30 in which the apparatus comprises an energy reservoir at a predetermined voltage, and in which the protection mechanism delivers current to the energy reservoir.

37. A method comprising

setting an average voltage across a series pass element in an active filter based upon variations in a signal that is to be filtered.

38. The method of claim 37 further comprising

measuring peak-to-peak variations in the signal to be filtered

39. The method of claim 38 further comprising

setting the average voltage to be slightly greater than the peak-to-peak variations.